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Part 21: Implementation methods: Clear text encoding of the exchange structure

AMENDMENT 1

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Foreword

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Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Amendment 1 to International Standard ISO 10303-21:1994 was prepared by Technical Committee ISO/TC 184, *Industrial automation systems and integration*, Subcommittee SC 4, *Industrial data*.

Industrial automation systems and integration — Product data representation and exchange — Part 21: Implementation methods: Clear text encoding of the exchange structure

AMENDMENT 1

Introduction

This document amends ISO 10303-21:1994/Cor.1:1995; Industrial automation systems and integration —Product data representation and exchange —Part 21: Implementation methods: Clear text encoding of the exchange structure. The amended document supersedes ISO 10303-21:1994/Cor.1:1995.

The modifications to the text of ISO 10303-21:1994/Cor.1:1995 are of three kinds. Each modification is identified as to which kind it represents and is marked with a diamond (♦). The four kinds of modifications are:

- ♦ CHANGE: A change to the requirements of ISO 10303-21:1994. Such a modification affects the conformance of implementations.

- ♦ Clarification: A modification to the text to remove ambiguities, incorrect implications, and other wording which makes the determination of the requirements difficult. Such a modification should not affect conformance of implementations, unless the implementors were confused by the previous texts.

- ♦ Editorial: A modification to the text to delete redundancies and unused sub-clauses, or to move a misplaced specification into the proper clause.

The changes to 6.3, 7.1, 9.1, 9.2.3, and 10 and the addition of clauses 9.2.4 and 9.2.5 facilitate the development and implementation of other parts of ISO 10303. The changes to 5.3, 7, 10.2, 11.2.4, 11.2.5, and F.4 relax requirements to make implementation more practicable. The change to 9.2.1 distinguishes an encoding conforming to ISO 10303-21 as amended from an encoding conforming to ISO 10303-21:1994 or ISO 10303-21:1994/Cor.1:1995.

Clause 2

♦ (Editorial) Add the following term, in numeric order, to the list of normative references:

ISO 639:1988 *Code for the representation of names of languages.*

Clause 3.4

♦ (Editorial) Add the following terms, in alphabetic order, to the list of terms defined in ISO 10303-11:

- complex entity instance
- partial complex entity instance
- simple entity instance

Clause 5.3 (Conformance)

♦ (CHANGE) Delete paragraph 6 (beginning "Two classes of syntactical conformance")

Clause 5.3

♦ (CHANGE) Replace paragraph 3, beginning "schema conformance of the exchange structure" with:

- schema conformance of the exchange structure: the instances represented in the exchange structure conform to the schemas listed in the header section of the exchange structure if every requirement or constraint of these schemas is satisfied with respect to each instance or grouping of instances to which it shall apply whatsoever and the mapping requirements defined in clauses 10 and 11 of this part of ISO 10303 are satisfied.

Clause 6.3

♦ (CHANGE) Replace paragraph 1, sentence 2 with:

"The exchange structure shall consist of at least two sections: the header section and one or more data sections."

Clause 7

♦ (CHANGE) Delete paragraph 4 (beginning "The special token "&SCOPE"")

Clause 7.1

♦ (CHANGE) Replace paragraph 1 (beginning "The special token "DATA;"") with:

The special token "DATA" shall be used to open the data sections of an exchange structure, and the special token "ENDSEC;" shall be used to close the data sections of an exchange structure.

Table 3

♦ (CHANGE) Replace the production for EXCHANGE_FILE with

```
EXCHANGE_FILE = "ISO-10303-21;"
   HEADER_SECTION DATA_SECTION { DATA_SECTION }
   "END-ISO-10303-21;" .
```

♦ (CHANGE) Replace the production for DATA_SECTION with

```
DATA_SECTION = "DATA" [ "(" PARAMETER_LIST ")" ] ";"
   ENTITY_INSTANCE_LIST "ENDSEC;"
```

♦ (CHANGE) Remove the production for SCOPE.

♦ (CHANGE) Replace the production for SIMPLE_ENTITY_INSTANCE with:

```
SIMPLE_ENTITY_INSTANCE = ENTITY_INSTANCE_NAME "=" SIMPLE_RECORD ";" .
```

♦ (CHANGE) Replace the production for COMPLEX_ENTITY_INSTANCE with:

```
COMPLEX_ENTITY_INSTANCE = ENTITY_INSTANCE_NAME "=" SUBSUPER_RECORD ";" .
```

Clause 9.1 (Header section entities)

♦ (CHANGE) Replace paragraph 1 with:

The header section of every exchange structure shall contain one instance of each of the following entities: **file_description**, **file_name**, and **file_schema**, and they shall appear in that order. Instances of **section_language** and **section_context** may appear after **file_schema**. If instances of user-defined header section entities are present, they shall appear after the header section entity instances defined in this section. The syntax of the header section entity instances is given in table 3 in WSN. Each entity name shall map to the KEYWORD of the HEADER_ENTITY production. Clause 11 provides mapping of simple and aggregate data types to the PARAMETER_LIST for the attribute values of these entity instances.

Clause 9.2

♦ (CHANGE) In subclause 9.2.1, under "Attribute Descriptions", replace entire text of implementation_level and the following note with the following:

implementation_level: an identification of the specification to which the encoding in this exchange structure conforms and any conformance options employed in that encoding. The value of this attribute shall indicate conformance to this version of this part of ISO 10303 by having the value "3;1".

NOTES

1 - The general form for the value is "v;cc", where v is the version number of this part of ISO 10303, as specified in annex C, and cc is the encoding of conformance class. Future versions of this part of ISO 10303 may specify additional values for v and cc.

♦ (CHANGE) In subclause 9.2.3, insert the following text before "*) END_SCHEMA;".

9.2.4 section_language

The **section_language** entity identifies the default language for string values in a data section. The attribute default_language shall contain the name of the language. The name of the language shall be encoded as set forth in ISO 639.

If the name of a language contains small letters, such small letters shall be converted to the corresponding capital letters. Only capital letters shall occur in strings of the language_name.

The attribute section shall contain the name of a data section in the exchange structure for which the default language shall apply. If the attribute section is unset ($), the default language shall apply to all data sections in the exchange structure for which no other **section_language** instance exists. If the exchange structure contains a single, unnamed, data section, the attribute section shall be specified as "$"

EXPRESS Specification:

```
*)
ENTITY section_language;
  section  :  section_name;
  default_language : language_name;

UNIQUE
  UR1: section;
END_ENTITY;

TYPE language_name = STRING;
END_TYPE;
(*
```

Attribute Descriptions:

section: name of the data section for which the default_language is to apply.

default_language: name of the language used for string values.

9.2.5 section_context

The **section_context** entity identifies information describing the contexts within which the instances encoded in the exchange structure are applicable.

The attribute section shall contain the name of a data section in the exchange structure for which the context identifiers shall apply. If the attribute section is unset ($), the context identifiers shall apply to all data sections in the exchange structure for which no other **section_context** instance exists. If the exchange structure contains a single, unnamed, data section, the attribute section shall be specified as "$"

EXAMPLE - An application protocol may define symbolic identifiers for each application protocol conformance class. The context identifiers for a section may indicate a partial list of application protocol conformance classes satisfied by the data in the section.

EXPRESS Specification:

```
*)
ENTITY section_context;
  section  : section_name;
  context_identifiers : LIST [1:?] OF context_name;
END_ENTITY;

TYPE context_name = STRING;
END_TYPE;
(*
```

Attribute Descriptions:

section: name of the data section for which the context_identifiers are to apply.

context_identifiers: identifiers which convey contextual information about instances encoded in the exchange structure.

Clause 9.2.3

♦ (CHANGE) Delete text "The schema_identifiers attribute shall contain exactly one schema_name."

♦ (CHANGE) replace the EXPRESS entity definition for file_schema with:

```
ENTITY file_schema;
  schema_identifiers : LIST [1:?] OF UNIQUE schema_name;
END_ENTITY;
```

Clause 10

♦ (CHANGE) Replace paragraph 1 (beginning "The data section") with:

The data sections contain instances to be transferred by the exchange structure. At least one data section shall be present in every exchange structure. Each data section contains instances of entities that correspond to one EXPRESS schema specified in the header section.

The syntax of the data section is specified in table 3. Each data section shall begin with the "DATA" keyword. If an exchange structure contains more than one data section, each "DATA" keyword shall be followed by a parenthesized PARAMETER_LIST containing a STRING and a LIST parameter.

The first parameter shall be a STRING containing a unique name for the section. The second parameter shall be a LIST containing exactly one STRING. The string shall be the name of the schema that shall govern the data section. The schema name must appear in the header section FILE_SCHEMA entry.

If an exchange structure contains only one data section, the parenthesized PARAMETER_LIST may be omitted. In this case, the header section FILE_SCHEMA entry shall specify only one schema, and that schema shall govern the data section.

Each data section shall be terminated with the special token "ENDSEC;".

Clause 10.1

♦ (CHANGE) In paragraph 1, sentence 2, replace "at most once in the data section" with "at most once in the exchange structure"

Clause 10.2 (Scope structure)

♦ (CHANGE) Delete 10.2 and renumber 10.3 accordingly.

Clause 11.1.7 (Enumeration)

♦ (CHANGE) Replace paragraph 1 with:

Values of an EXPRESS ENUMERATION data type shall be mapped to the exchange structure as an enumeration data type. 7.3.5 describes the composition of a enumeration data type.

If the document that defines the schema whose instances are the subject of the data section also defines a set of short names for the enumerated values within that schema, the actual

value in an instance of the ENUMERATION shall be the short name corresponding to one of the enumerated values in the EXPRESS schema. Otherwise, the actual value shall be one of the enumerated values in the EXPRESS schema. In either case, any small letters shall be converted to the corresponding capital letters, and the value shall be delimited by full stops "." as defined in the ENUMERATION production of table 2.

Clause 11.2.4 (Entity with other entities as attributes)

♦ (CHANGE) Delete paragraph 1, sentence 2, (beginning "The reference to this entity instance")

♦ (CHANGE) In Example 31, replace all text from the phrase "Sample entity instance in data section" to the end of the example with:

Sample entity instance in data section:

```
#1 = YYY (3., 4., 5.);
#2 = XXX (#1, #3);
#3 = YYY (1., 2., 3.);
```

Clause 11.2.5 (Entities defined as subtypes of other entities)

♦ (CHANGE) Delete paragraph 4 (beginning "The selection of which mapping rule")

Clause 11.2.5.1 (Default selection of mapping)

♦ (Clarification) Replace the title with the following:

11.2.5.1 Selection of mapping

Clause F.4 (Example exchange structure)

♦ (CHANGE) Replace all text from "/* A SLIGHTLY DIFFERENT WAY OF REPRESENTING THE TRIANGULAR EDGE-LOOP" to "OWNERSHIP CHARACTERISTICS OF HIS/HER SYSTEM */" with the following:

```
/*
    OTHER SYNTACTICAL REPRESENTATIONS WERE POSSIBLE. THE PREVIOUS
    EXAMPLE IS REPRESENTATIVE OF ONE POSSIBLE APPROACH.
*/
```